2012 - Arizona Risk Analysis

Largemouth Bass Virus (LMBV)

Name

Largemouth Bass Virus (LMBV) is in the family *Iridoviridae*, which includes many pathogens of invertebrate and lower vertebrate animals (Grizzle and Brunner 2003). There are four genus level groups in the Iridoviridae family, *Iridovirus, Chloriridovirus, Ranavirus, and Lymphocystisvirus.* It is not known what genus this specific virus belongs to. (www.in.gov)

Description

LMBV is the only virus known to cause a newly recognized lethal disease of wild largemouth bass *(Micropterus salmonides)*. The disease usually occurs during the summer and typically affects adult fish (Grizzle and Brunner 2003). The largemouth bass virus is an icosahedra-shaped particle without an envelope. It occurs in the cytoplasm of host fish cells. When it passes out of the plasma membrane of the host fish cell, it acquires an envelope (Kipp 2012).

In largemouth bass signs of the disease may include increased blood flow and darkened skin, distended abdomen, bloated swim bladder, lesions in the membrane lining the body cavity, necrosis (burst cells resulting in inflammation) of gastrointestinal mucosa, pale liver, red spleen, red intestinal caeca, infected gills, lethargic swimming, decreased responsiveness, swimming at the surface and/or in circles, and difficulty remaining upright. Sores or lesions on the outside of the body are secondary and not caused by the actual viral infection (Kipp 2012).

Life History

LMBV does not only infect largemouth bass, the virus is experimentally pathogenic in striped bass *(Morone saxatillis)* but has never caused fish kills in this species in the wild. LMBV can also subclinically and non-lethally infect smallmouth bass *(Micropterus dolomieui),* bluegill *(Lepomis macrochirus),* crappie *(Pomoxis spp.),* and chain pickerel *(Esox niger).* This virus usually only causes death in largemouth bass. It is unknown why this virus kills largemouth bass and not other fish. Often largemouth bass infected with LMBV will show no signs of disease. This virus attacks the swim bladder of infected individuals. Besides fish, LMBV has been found in other cold-blooded animals like amphibians and reptiles (www.in.gov).

Ecology

LMBV can be passed from one infected fish to another so any practices that keep infected and uninfected fishes that are in close contact or at high densities can increase transmissions. LMBV can be transmitted through the water and also orally via ingestion of infected animals. Transmission from adults to offspring probably does not occur or is very rare. The virus can affect largemouth bass lethally or subclinically (without symptoms), and is particularly prone to infect bass over 30 cm long. Once exposed to LMBV, a population of largemouth bass produces antibodies such that subsequent exposures result in less extreme manifestations of the disease. Fish kills can be slow and last for several weeks (Kipp 2012).

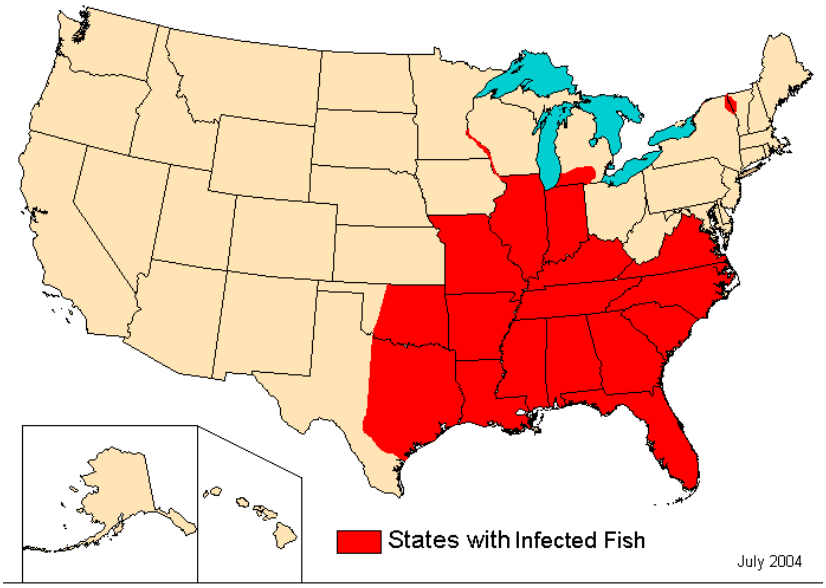
Environmental Tolerances and Restrictions

It is believed that stress triggers the disease of the virus. Stressful factors include hot weather, poor water quality, pollution, crowding in live well tanks, frequent handling by anglers, and other pathogens (www.in.gov).

Distribution

The origin if LMBV is unknown. However, this virus is very similar to two fish viruses from Southeast Asia (Kipp 2012).

It was first discovered in the United States in Florida. It has since been detected in 18 other states including Alabama, Arkansas, Georgia, Illinois, Indiana, Kentucky, Louisiana, Michigan, Missouri, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, Vermont, and Wisconsin (www.in.gov).



Current Status in Arizona
Saguaro Lake, Bartlett Lake, Roosevelt Lake and Lake Pleasant have all tested positive for LMBV.

Dispersal/Spread
It seems that LMBV can be transmitted through the water, fish to fish contact, and by consuming infected prey. Because LMBV can survive in the water for up to seven days, it can be transferred in the live wells of boats. Other fish carry the disease so infected but disease fish could be stocked and transfer the virus into new waters (www.in.gov).

Known/Potential Impacts
A disease outbreak of LMBV usually attacks adult largemouth bass which causes concern among anglers. Anglers are worried that this virus could damage the fishery at their favorite fishing spot. Usually the number of fish that die from the disease is relatively low compared to the entire population. Fishing may be poor following a fish kill but it is thought that there are no long-term effects on largemouth bass populations. Fish kills only seem to occur during or after stressful situations, so theoretically a fish could be carrying the virus but feel none of the effects. Much has yet to be learned about LMBV so precautions should be taken to ensure that this virus does not spread into new waters (www.in.gov).

Benefits
None.

Effective Treatments
There is nothing that can be done to eradicate LMBV in the wild.

Threats to Arizona
A possible largemouth bass die off.

Human Health Threats

LMBV has never been detected in warm-blooded animals, including humans. Infected fish are edible as long as they are cooked properly (www.in.gov).

Recommendations

Through Directors Order, list Largemouth Bass Virus (LMBV) in the family *Iridoviridae* (four genus level groups: *Iridovirus, Chloriridovirus, Ranavirus, and Lymphocystisvirus*) as an aquatic invasive species in Arizona per ARS 17 – 255.01 B1.

Arizona action plans should include:

A. Develop outreach materials and educate the public on:
    1. The importance of cleaning, draining, and drying their boats and equipment prior to leaving any water.
    2. Unlawful transport of live fish and/or baitfish has significant potential to transmit harmful pathogens and negatively impact fish populations.
    3. Techniques to reduce or minimize stress on largemouth bass while fishing in an LMBV positive lake.
B. Continue to implement an Arizona-wide surveillance of disease and parasite testing.
C. Begin to study the impacts of LMBV and its effects on LMBV positive lakes in Arizona.
D. Continue standardized surveys on Lake Pleasant every three years to track largemouth bass population trends.

References

www.in.gov/dnr/files/LMBV.pdf, Aquatic Invasive Species. Largemouth Bass Virus. Updated 4/05.

Rebekah M. Kipp. 2012. *Ranavirus* . USGS Nonindigenous Aquatic Species Database, Gainesville, FL. Revision Date: 6/12/2007

Grizzle, John M. and Brunner, Cindy J. (2003): Review of Largemouth Bass Virus, Fisheries, 28:11, 10-14.